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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,976	Applicant(s) DE SCHAMPS, MARC
	Examiner MARC B. DEMERS	Art Unit 4133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 1-23 is/are rejected.
- 7) Claim(s) ____ is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on ____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement (PTO/SB/08) _____
 Paper No(s)/Mail Date 08/10/2006
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____
- 5) Notice of Informal Patent Application
- 6) Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1, 9, 10, 12-18 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tadashi (JP No. 2002-298919, see machine translation) in view of Gozdz et al. (US 5,552,239).

Regarding claim 1, Tadashi discloses a process for the preparation of an electrochemical device composed of a polyether/lithium salt electrolyte film between two films respectively constituting the positive electrode and the negative electrode ([0014] 'fine porous film... polyolefin'; [0006]), wherein the process comprises assembling a multilayer structure comprising a current-collecting support ([0015] 'anode axis'; [0016] 'cathode axis'), a film intended to form the positive electrode ([0019] 'slurry or paste'), a polyether film intended to form the electrolyte ([0014]) and a film intended to form the

negative electrode ([0018]), wherein:

the film intended to form the positive electrode and/or the film intended to form the negative electrode are composed of a composite material comprising the lithium salt ([0006]); and the assembled device is left at rest for a time sufficient to allow the lithium salt present in the material of the positive electrode and/or in the material of the negative electrode to diffuse into the polymer film ([0007] 'lithium salt concentration in... anode and/or cathode... higher than the... concentration... in a separator', [0022] 'battery produced like this'; diffusion, an inherent characteristic, will occur after assembly in this manner and battery allowed to rest).

Tadashi does not expressly disclose wherein the polyether film intended to form the electrolyte does not comprise lithium salt.

However, Gozdz does teach a similar process for making a battery wherein the separator/electrolyte element is formulated without a lithium salt component (col 2, ln 64-67).

Tadashi and Gozdz are combinable because they are concerned with the same field of endeavor, namely a process of producing a rechargeable battery.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Gozdz's feature of no lithium salt initially in the separator/electrolyte to the method of battery production of Tadashi because that helps to avoid the deleterious effects of atmospheric humidity during the production process (see Gozdz col 2, ln 64-67).

Regarding claim 9, modified Tadashi discloses all the claim limitations as set forth above, and further discloses wherein the composite material of the film intended to form the positive electrode comprises an active material, a binder, a material conferring electronic conductivity ('natural graphite; cathode axis which comprises copper') and the lithium salt ([0019]; [0020]).

Regarding claim 10, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the positive electrode active material is selected from the group consisting of $\text{Li}_{1+x}\text{V}_3\text{O}_8$, $0 < x < 4$, $\text{Li}_x\text{V}_2\text{O}_5 \cdot n\text{H}_2\text{O}$, $0 < x < 3$, $0 < n < 2$, LiFePO_4 , hydrated or anhydrous iron phosphates and sulfates, hydrated or anhydrous vanadyl phosphates and sulfates, LiMn_2O_4 , the compounds derived from LiMn_2O_4 obtained by partial substitution of Mn by Al, Ni and/or Co, LiMnO_2 , the compounds derived from LiMnO_2 obtained by partial substitution of Mn by A1, Ni and/or Co, LiCoO_2 , the compounds derived from LiCoO_2 obtained by partial substitution of Li by Al, Ti, Mg, Ni and/or Mn, LiNiO_2 and the compounds derived from LiNiO_2 obtained by partial substitution of Ni by Al, Ti, Mg and/or Mn.

However, Gozdz does teach a similar process wherein the positive electrode active material is LiMn_2O_4 (col 6, ln 26-37).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Gozdz's feature of the positive electrode active material being LiMn_2O_4 to the process of making battery of Tadashi because such an active material has shown good results in earlier cell compositions (see Gozdz col 3, ln 12-15).

Regarding claim 12, modified Tadashi discloses all the claim limitations as set forth above, and further discloses wherein the film intended to form the negative electrode is composed of a composite material which comprises an active material, a binder, a material conferring electronic conductivity ('acetylene black') and the lithium salt ([0018]; [0020]).

Regarding claim 13, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the active material is selected from the group consisting of: carbon compounds, alloys with lithium of Li_xM type (M=Sn, Sb, Si) (obtained from SnO, from SnO₂, from Sn, Sn-Fe(-C) compounds, from Si compounds, from Sb compounds), and Li_xCu₆Sn₅ (0<x<13) compounds, iron borates, pnictides, simple oxides possessing reversible decomposition and insertion oxides, such as titanates, MoO₃ or WO₃.

However, Gozdz does teach a similar process wherein the active material is a carbon compound (col 8, ln 17-21 'carbon coke'; Super-P carbon').

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Gozdz's feature of the negative electrode active material being a carbon compound to the process of making battery of Tadashi because such an active material has shown good results in earlier cell compositions (see Gozdz col 3, ln 12-19).

Regarding claim 14, modified Tadashi discloses all the claim limitations as set forth above, and further discloses wherein the lithium salt is selected from the group consisting of LiPF₆, LiAsF₆, LiClO₄, LiBF₄, LiC₄BO₈, Li(C₂F₅SO₂)₂N, Li[(C₂F₅)₃PF₃], LiCF₃SO₃, LiCH₃SO₃ and LiN(SO₂CF₃)₂. ([0015] 'LiN(SO₂CF₃)₂').

Regarding claim 15, modified Tadashi discloses all the claim limitations as set forth above, and further discloses wherein the binder is composed either of a nonsolvating polymer and at least one polar aprotic compound, or of a solvating polymer ([0019] 'PVdF'; 'N-methyl pyrrolidone').

Regarding claim 16, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the polar aprotic compound is selected from the group consisting of linear or cyclic carbonates, linear or cyclic ethers, linear or cyclic esters, linear or cyclic sulfones, sulfamides and nitriles.

However, Gozdz does teach a similar process wherein the polar aprotic compound is a cyclic ether (col 8, ln 17-21 'THF').

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Gozdz's feature of the polar aprotic compound being a cyclic ether to the process of making a battery of Tadashi because such a formulation serves well to formulate basic cells useful in the procedures of the invention (see Gozdz col 5, ln 55-59).

Regarding claim 17, modified Tadashi discloses all the claim limitations as set forth above, and further discloses wherein the nonsolvating polymer is selected from the group consisting of:

- vinylidene fluoride homopolymers and copolymers, • copolymers of ethylene, of propylene and of a diene, • tetrafluoroethylene homopolymers and copolymers, • N-vinylpyrrolidone homopolymers and copolymers, • acrylonitrile homopolymers and copolymers, • methacrylonitrile homopolymers and copolymers ([0019] 'PVdF').

Regarding claim 18, modified Tadashi discloses all the claim limitations as set forth above, and further discloses wherein the nonsolvating polymer carries ionic functional groups ([0019] 'PVdF').

Regarding claim 20, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the compound conferring electronic conduction properties is preferably a carbon black which does not catalyze the oxidation of the electrolyte at high potential.

However, Gozdz does teach a similar process wherein the compound conferring electronic conduction properties is preferably a carbon black which does not catalyze the oxidation of the electrolyte at high potential (col 8, ln 17-21 'Super-P carbon').

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Gozdz's feature of using a carbon black as the compound conferring electronic conduction properties to the process of making a battery of Tadashi because such an active material has shown good results in earlier cell compositions (see Gozdz col 3, ln 12-19).

Regarding claim 21, modified Tadashi discloses all the claim limitations as set forth above, and further discloses wherein the composite material additionally comprises a nonvolatile liquid organic solvent ([0019] 'N-methyl pyrrolidone').

Regarding claim 22, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein said liquid solvent is selected from the group consisting of:

- polar aprotic compounds, such as linear or cyclic carbonates, linear or cyclic ethers,

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linear or cyclic esters, linear or cyclic sulfones, sulfamides and nitriles,

- phthalates, such as dioctyl phthalate, dibutyl phthalate and dimethyl phthalate,

- a polyethylene glycol or poly(ethylene glycol) dimethyl ether of low mass.

However, Gozdz does teach a similar process wherein said liquid solvent is selected from the group consisting of:

- polar aprotic compounds, such as linear or cyclic carbonates, linear or cyclic ethers, linear or cyclic esters, linear or cyclic sulfones, sulfamides and nitriles (col 8, ln 17-21 'THF').

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Gozdz's feature of adding a liquid solvent selected from polar aprotic compounds to the process of making a battery of Tadashi because such a formulation serves well to formulate basic cells useful in the procedures of the invention (see Gozdz col 5, ln 55-59).

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tadashi (JP No. 2002-298919, see machine translation) in view of Gozdz et al. (US 5,552,239) as applied to claims 1, 9, 10, 12-18 and 20-22, above, and further in view of Hayase et al. (US 2003/0228521).

Regarding claim 2, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the films respectively constituting the negative electrode, the positive electrode and the electrolyte have thicknesses of between 10 µm and 150 µm.

However, Hayase does teach a similar process wherein the film thicknesses constituting the negative electrode is 100 µm, the positive electrode is 100 µm, and the electrolyte ('separator') is 50 µm ([0260]).

Tadashi, Gozdz and Hayase are combinable because they are concerned with the same field of endeavor, namely a process for making a rechargeable battery.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Hayase's feature of the negative electrode, positive electrode, and separator having thickness of between 50 to 100 µm to the process of making a battery of Tadashi because decreasing the thickness of the separator improves battery performance and these cited thicknesses represent preferred examples of the invention (see Hayase [0216]; [0235]).

5. Claims 3-8, 19 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tadashi (JP No. 2002-298919, see machine translation) in view of Gozdz et al. (US 5,552,239) as applied to claims 1, 9, 10, 12-18 and 20-22, above, and further in view of Harvey et al. (US 2004/0024174).

Regarding claim 3, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the polyether is chosen from the copolymers which are obtained from ethylene oxide and from at least one substituted oxirane and which comprise at least 70% of -CH₂-CH₂O- repeat units derived from ethylene oxide.

However, Harvey does teach a similar process wherein the polyether is chosen from the copolymers which are obtained from ethylene oxide and from at least one

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substituted oxirane and which comprise at least 70% of -CH₂-CH₂O- repeat units derived from ethylene oxide ([0012]; [0017]; [0022]).

Tadashi, Gozdz and Harvey are combinable because they are concerned with the same field of endeavor, namely a method of making a rechargeable battery.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Harvey's feature of the polyether being chosen from the copolymers which are obtained from ethylene oxide and from at least one substituted oxirane and which comprise at least 70% of -CH₂-CH₂O- repeat units derived from ethylene oxide to the process of making a battery of Tadashi because it gives an ionically conductive material of excellent mechanical properties and additionally shows excellent chemical compatibility with the electrodes of a generator when used as an electrolyte (see Harvey [0012]).

Regarding claim 4, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the polyether comprises -O-CH₂-CHR- units, derived from an oxirane CH₂ - CHR – O, in which R is an alkyl radical.

However, Harvey does teach a similar process wherein the polyether comprises -O-CH₂-CHR- units, derived from an oxirane CH₂ - CHR – O, in which R is an alkyl radical. ([0017]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Harvey's feature of the polyether comprising -O-CH₂-CHR- units, derived from an oxirane CH₂ - CHR – O, in which R is an alkyl radical to the process of

making a battery of Tadashi because it gives an ionically conductive material of excellent mechanical properties and additionally shows excellent chemical compatibility with the electrodes of a generator when used as an electrolyte (see Harvey [0012]).

Regarding claim 5, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein R is an alkyl radical having from 1 to 16 carbon atoms.

However, Harvey does teach a similar process wherein R is an alkyl radical having from 1 to 16 carbon atoms. ([0018]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Harvey's feature of R being an alkyl radical having from 1 to 16 carbon atoms to the process of making a battery of Tadashi because it gives an ionically conductive material of excellent mechanical properties and additionally shows excellent chemical compatibility with the electrodes of a generator when used as an electrolyte (see Harvey [0012]).

Regarding claim 6, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the polyether comprises -O-CH₂CHR'- units, derived from an oxirane CH₂ - CHR'-O in which R' is a group capable of polymerizing by the radical route.

However, Harvey does teach a similar process wherein the polyether comprises -O-CH₂CHR'- units, derived from an oxirane CH₂ - CHR'-O in which R' is a group capable of polymerizing by the radical route ([0018]; [0019]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Harvey's feature of the polyether comprising -O-CH₂CHR'- units, derived from an oxirane CH₂ - CHR'-O in which R' is a group capable of polymerizing by the radical route to the process of making a battery of Tadashi because it gives an ionically conductive material of excellent mechanical properties and additionally shows excellent chemical compatibility with the electrodes of a generator when used as an electrolyte (see Harvey [0012]).

Regarding claim 7, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein said group capable of polymerizing by the radical route is selected from the group consisting of a vinyl, allyl, vinylbenzyl and acryloyl group.

However, Harvey does teach a similar process wherein said group capable of polymerizing by the radical route is selected from the group consisting of an allyl ([0029] 'allyl glycidyl ether').

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Harvey's feature of said group capable of polymerizing by the radical route being selected from the group consisting of an allyl to the process of making a battery of Tadashi because it gives an ionically conductive material of excellent mechanical properties and additionally shows excellent chemical compatibility with the electrodes of a generator when used as an electrolyte (see Harvey [0012]).

Regarding claim 8, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the polyether comprises repeat units derived from several substituted oxiranes.

However, Harvey does teach a similar process wherein the polyether comprises repeat units derived from several substituted oxiranes ([0019]; [0020]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Harvey's feature of the polyether comprising repeat units derived from several substituted oxiranes to the process of making a battery of Tadashi because it gives an ionically conductive material of excellent mechanical properties and additionally shows excellent chemical compatibility with the electrodes of a generator when used as an electrolyte (see Harvey [0012]).

Regarding claim 19, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the binder is a solvating polymer selected from the group consisting of polyethers of linear, comb or block structure, forming or not forming a network, based on poly(ethylene oxide); copolymers comprising the ethylene oxide or propylene oxide or allyl glycidyl ether unit; polyphosphazenes; crosslinked networks based on polyethylene glycol crosslinked by isocyanates; copolymers of oxyethylene and of epichlorohydrin; and networks obtained by polycondensation which carry groups which make possible the incorporation of crosslinkable groups.

However, Harvey does teach a similar process wherein the binder is a solvating polymer selected from the group consisting of copolymers comprising the ethylene

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oxide or propylene oxide or allyl glycidyl ether unit ([0048] 'conductive binder'; [0013] 'copolymer... comprising ethylene oxide units').

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Harvey's feature of the binder being a solvating polymer selected from the group consisting of copolymers comprising the ethylene oxide unit to the process of making a battery of Tadashi because it gives an ionically conductive material of excellent mechanical properties and additionally because they contain only a small number of species which can interfere with the electrochemical reactions (see Harvey [0012]; [0048]).

Regarding claim 23, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the polyether of the film intended to form the electrolyte is a copolymer comprising crosslinkable units and in that at least one of the electrodes is composed of a composite material which additionally comprises a crosslinking agent for said polyether.

However, Harvey does teach a similar process wherein the polyether of the film intended to form the electrolyte is a copolymer comprising crosslinkable units and in that at least one of the electrodes is composed of a composite material which additionally comprises a crosslinking agent for said polyether. ([0012] 'cross-linkable'; [0048])

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Harvey's feature of the polyether of the film intended to form the electrolyte being a copolymer comprising crosslinkable units and in that at least one of the electrodes being composed of a composite material which additionally comprises a

crosslinking agent for said polyether to the process of making a battery of Tadashi because it gives an ionically conductive material of excellent mechanical properties and additionally shows excellent chemical compatibility with the electrodes of a generator when used as an electrolyte, and additionally because they contain only a small number of species which can interfere with the electrochemical reactions (see Harvey [0012]; [0048]).

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tadashi (JP No. 2002-298919, see machine translation) in view of Gozdz et al. (US 5,552,239) as applied to claims 1, 9, 10, 12-18 and 20-22, above, and further in view of Benson et al. (US 2004/0023106).

Regarding claim 11, modified Tadashi discloses all the claim limitations as set forth above, but modified Tadashi does not expressly disclose wherein the film constituting the negative electrode is a lithium film.

However, Benson does teach a similar process wherein the film constituting the negative electrode is composed of lithium ([0019] 'lithium anode').

Tadashi and Benson are combinable because they are concerned with the same field of endeavor, namely the fabrication of rechargeable batteries.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Benson's feature of the film constituting the negative electrode being composed of lithium to the process of making a battery of Tadashi because a lithium anode configuration is among the possible acceptable choices for materials for such a device (see Benson [0019]).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARC B. DEMERS whose telephone number is (571)270-1230. The examiner can normally be reached on Monday - Thursday, 7:30 AM to 5:00 PM, every other Friday 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on (571) 272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B. D./
Examiner, Art Unit 4133

/Basia Ridley/
Supervisory Patent Examiner, Art Unit 4133